[DESCRIPTION]

[Invention Title]

SURFACE TYPE HEATING ELEMENT AND ROLL SCREEN TYPE HOME SAUNA APPARATUS USING THE SAME

[Technical Field]

The present invention relates, in general, to a surface type heating element and a roll screen type home sauna apparatus using the heating element and, more particularly, to a surface type heating element, which is made by interweaving carbon yarn, antibacterial and anti-fungal aluminum yarn, transparent PET film yarn, and polyester yarn with each other at regular intervals, thus eliminating the danger of electric shock, and maximizing heat generating efficiency, and to a roll screen type home sauna apparatus, capable of manually or automatically winding or unwinding the surface type heating element.

[Background Art]

Recently, people have a growing interest in health so that a new idea, "well being", meaning a healthy life, has appeared. The interest in health is expressed in various ways. Currently, anything promoting good health, including food and clothing, is preferred.

Among things that are enjoyed for the purpose of good health, saunas are not present in all homes. Saunas help

remove unhealthy elements from the body through sweat. While a person enjoys having a sauna, hydrogen accumulated in the body is discharged along with sweat through perspiration, thus eliminating unnecessary and harmful elements from the body.

Saunas are usually used in public bathhouses. Recently, simple sauna apparatuses have been proposed so that people may enjoy having saunas at home.

FIG. 1 is a view showing a conventional surface type heating element and a sauna apparatus using the heating element, which is disclosed in U.M Registration No. 255910.

As shown in FIG. 1, the conventional simple sauna apparatus includes a shower stall 100 having a wall 110 and a door 112, and a surface type heating element 102.

The inner surface of the wall 110 of the shower stall 100 is surrounded with the surface type heating element 102 that emits heat. The conventional surface type heating element 102 includes a base fabric 106, a conductive coating layer 104, and an insulating film 108. Conductive powder, such as carbon, or inorganic acidic powder emitting far infrared rays is applied to the base fabric 106 or the like surface, thus forming the conductive coating layer 104. A surface of the conductive coating layer 104 is coated with the insulated film 108.

In such a conventional sauna apparatus, when an electrode is connected to the surface type heating element 102 so as to supply electricity to the surface type heating

element 102, heat is generated due to electric resistance of the conductive film layer, thus allowing a user sitting in the shower stall to enjoy having a sauna.

However, as shown in FIG. 1, the conventional sauna apparatus is manufactured in the shape of a rectangular stall, so that it occupies a large space. Thus, it is difficult to install the sauna apparatus in a bathroom having a limited space.

Further, the surface type heating element used in the conventional sauna apparatus is manufactured by applying a conductive material, such as carbon. However, when the conductive material in powder form is applied to the base fabric, it is impossible to obtain high heat from electric resistance due to irregular coating. Further, the concentration of the powder is different in different positions, so that it is impossible to obtain constant heat.

In order to prevent electric shock, the conventional sauna apparatus has on the wall a shielding means which isolates the surface type heating element from the inner surface of the shower stall. Thus, the conventional sauna apparatus is problematic in that the additional shielding means is mounted all over the wall, so that the cost of manufacturing the sauna apparatus is increased.

Further, the conventional sauna apparatus is configured such that only a small window is provided at a predetermined position on the door 112 to admit light into

the shower stall. Thus, when the door 112 is closed, sufficient illumination is not ensured. Thereby, the conventional sauna apparatus is problematic in that an additional lighting lamp is required.

【Disclosure】

【Technical Problem】

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a surface type heating element, which has high heat generating efficiency, and uniformly radiates heat.

Another object of the present invention is to provide a surface type heating element having a circuit structure which is capable of considerably reducing the danger of electric shock.

A further object of the present invention is to provide a surface type heating element, which maximally radiates far infrared rays onto a user, in addition to having an anion radiating function, an antibacterial function, and a deodorizing function.

Yet another object of the present invention is to provide a sauna apparatus, which has a small volume, and in which a power supply line connected to the surface type heating element is not twisted when the surface type heating element is unwound or wound, thus stably supplying electricity.

[Technical Solution]

In order to accomplish the above objects, the present invention provides a surface type heating element, including rayon-based carbon yarn emitting resistance heat, when external AC power is supplied to the rayon-based carbon yarn; aluminum yarn having an antibacterial/anti-fungal function; and transparent synthetic resin film serving to admit sufficient illumination, wherein the rayon-based carbon yarn, the metallic yarn, and the transparent synthetic resin film each have a predetermined width, are laid adjacent to each other, and are interwoven with polyester yarn. Further, a radiation coating layer, containing the mixture of ore powder containing a large quantity of waterproof material, insulating material, fire resistant material, far infrared rays, and anions, and the far infrared radiating material is applied to a surface of the surface type heating element, and the heat blocking coating layer containing the mixture of the waterproof material, the insulating material, the fire resistant material, and the heat blocking material may be applied to the other surface of the surface type heating element. Further, upper portions of strands of the rayon-based carbon yarn are connected to a power supply line, and lower portions of strands of the rayon-based carbon yarn are connected to each other via a common connection part, thus providing a series parallel structure.

According to another embodiment of this invention, the present invention provides a roll screen type home sauna apparatus embedded into or attached to a ceiling in a bathroom, and including a surface type heating element to emit heat, when electricity is supplied to the surface type heating element, the home sauna apparatus including a surface type heating element including rayon-based carbon yarn emitting resistance heat, when external AC power is supplied to the rayon-based carbon yarn; aluminum yarn having an antibacterial/anti-fungal function; and transparent synthetic resin film serving to admit sufficient illumination, wherein the rayon-based carbon yarn, the metallic yarn, and the transparent synthetic resin film each have a predetermined width, are laid adjacent to each other, and are interwoven with polyester yarn, with upper portions of strands of the rayon-based carbon yarn connected to a power supply line, and lower portions of strands of the rayon-based carbon yarn connected to each other via a common connection part, thus providing a series parallel structure; a motor rotating in response to a control signal from an external controller; a shaft roller rolling or unwinding the surface type heating element, with a terminal of the surface type heating element being connected to the shaft roller; a shaft roller drive unit to transmit a rotation from the motor to the shaft roller; a limit regulator to detect a degree of rotation of the shaft roller drive unit, thus opening the

surface type heating element at a predetermined position; a slip ring, including a metal ring contacting the shaft roller, a brush to make sliding contact with the metal ring, an elastic part providing an elastic force to the brush, and a slip ring connector connected to an external power supply line, wherein, when the surface type heating element is unwound, electricity applied to the slip ring connector is supplied through the brush, the metal ring, and the shaft roller to the surface type heating element.

【Description of Drawings】

FIG. 1 is a view showing a conventional surface type heating element and a home sauna apparatus using the heating element;

FIG. 2a is a view showing a roll screen type home sauna apparatus, according to the preferred embodiment of the present invention;

FIGS. 2b and 2c are views showing the construction of the roll screen type home sauna apparatus, according to this invention, in which FIG. 2b shows the state where the home sauna apparatus is mounted to a side of a bathtub, and FIG. 2c shows the state where the home sauna apparatus is mounted to a shower stall;

FIGS. 3a and 3b are detailed views showing important parts of a surface type heating element, according to the preferred embodiment of this invention;

FIG. 3c is a detailed view showing important parts of

the coated surface type heating element, according to the preferred embodiment of this invention;

FIGS. 4a and 4b are wiring diagrams of strands of rayon-based carbon yarn, according to the preferred embodiment of this invention;

FIG. 5a is a detailed view of a winder, according to this invention;

FIG. 5b is a perspective view of a slip ring, according to the preferred embodiment of this invention; and

FIG. 5c is a view of a roll screen type home sauna apparatus having a mesh net, according to the preferred embodiment of this invention.

[Best Mode]

Hereinafter, a surface type heating element and a roll screen type home sauna apparatus using the heating element, according to the preferred embodiment of the present invention, will be described in detail with reference to the accompanying drawings.

FIG. 2a is a view showing a roll screen type home sauna apparatus, according to the preferred embodiment of the present invention, and FIGS. 2b and 2c are views showing the construction of the roll screen type home sauna apparatus, according to this invention, in which FIG. 2b shows the state where the home sauna apparatus is mounted to a side of a bathtub, and FIG. 2c shows the state where the

home sauna apparatus is mounted to a shower stall;

As shown in FIG. 2a, the roll screen type home sauna apparatus according to this invention includes a surface type heating element 200, a winder 202, and a controller 204.

According to this invention, when the surface type heating element 200 is not in use, the surface type heating element 200 is wound up and accommodated in the winder 202. Meanwhile, when the surface type heating element 200 is in use, the surface type heating element 200 is automatically unwound downwards in response to a signal from a controller.

When electricity is supplied to the surface type heating element 200 which has been unwound downwards, far infrared rays and anions are generated due to the resistance heat of rayon-based carbon yarn woven into the surface type heating element 200.

The weaving method, circuit structure, and power supplying method of the surface type heating element 200 will be described below in detail.

The winder 202 includes a motor and a shaft roller therein. In this case, the motor is driven forwards or backwards in response to the control signal of the controller 204. As the motor is driven, the shaft roller winds the surface type heating element 200 so as to receive it in the winder 202, or unwinds the surface type heating element 200 downwards.

The internal construction of the winder 202 will be described below in detail.

The controller 204 serves to drive the motor installed in the winder 202 or to supply electricity to the surface type heating element 200. The controller 204 may include a key pad 206 and a display 208.

A user selects the operation of winding or unwinding the surface type heating element 200, using the key pad 206. Further, it is possible to control the temperature or operating time of the surface type heating element 200 using the key pad 206.

Although not shown in the drawings, a temperature sensor may be connected to the controller 204. The temperature sensor detects the temperature of the surface type heating element 200 or the external temperature, prior to transmitting the detected result to the controller 204.

Further, although not shown in the drawings, a constant temperature sensor may be connected to the controller 204 of this invention. The constant temperature sensor detects the temperature of the surface type heating element 200 or the external temperature, and transmits the detected result to the controller 204. If the surface type heating element 200 exceeds a predetermined temperature and overheats, due to any failure of the surface type heating element 200, power supply is interrupted.

As such, when the signal detected by the sensor is input into the controller 204, the display 208 displays the

temperature of the surface type heating element 200 and the external temperature.

As shown in FIGS. 2b and 2c, the roll screen type home sauna apparatus according to this invention may be mounted to the side of a bathtub 220 or the side of a shower stall 230. The winder 202 may also be embedded in or attached to a ceiling.

When the surface type heating element 200 is not in use, the surface type heating element 200 is rolled and stored in the winder 202. In such a state, when the user manipulates the key pad 206, the surface type heating element 200 is unwound downwards. When the surface type heating element 200 has been unwound, electricity is automatically supplied to the surface type heating element 200, thus emitting heat.

As such, the sauna apparatus of this invention does not occupy a large space in a bathroom, unlike a conventional simple sauna apparatus. Further, the surface type heating element 200 is unwound only when it is in use, so that the surface type heating element 200 does not reduce useful space in the bathroom.

FIGS. 3a and 3b are detailed views showing important parts of the surface type heating element, according to the preferred embodiment of this invention.

As shown in FIG. 3a, the surface type heating element 200, according to this invention, includes rayon-based carbon yarn 300, transparent PET film yarn 302, aluminum

yarn 304 coated with antibacterial/anti-fungal agents, a radiation coating layer 306 having the mixture of ore powder containing a large quantity of waterproof material, insulating material, fire resistant material, far infrared rays, and anions, and far infrared radiating material, and a coating layer 308 having the mixture of a waterproof material, an insulating material, a fire resistant material, and a heat blocking material.

According to this invention, the rayon-based carbon yarn 300 containing 99.9% carbon is obtained by thermally processing PAN-based carbon fiber containing 95% carbon within the temperature range from 500℃ to 900℃. Even though an exothermic temperature is 3000℃, the physical properties of the rayon-based carbon yarn 300 are not changed.

The rayon-based carbon yarn 300 according to this invention may be selected from at least one of 3300 twisted carbon fibers(resistance 490±20Ω/m), 6600 twisted carbon fibers(resistance 250±20Ω/m), 2200 twisted carbon fibers(resistance 620±30Ω/m), 13200 twisted carbon fibers(resistance 130±15Ω/m), or combinations thereof. In this case, each carbon fiber has a diameter of about 200nm. However, the rayon-based carbon yarn 300 is not limited to the above-mentioned twisted carbon fibers.

Conventional rayon-based carbon yarn has used Pitch-based carbon fiber or PAN(Poly-Acrylonitrile)-based carbon fiber, which contains 95% carbon. When the rayon-based

carbon yarn according to this invention is used, a large amount of far infrared rays is emitted.

Particularly, when the surface type heating element is manufactured by applying PAN-based carbon fiber or carbon powder, the connection of the carbon fiber to a copper plate (electrode portion) is poor. Due to the resistance at the connecting portions, heat is generated, so that it is impossible to use the surface type heating element for a lengthy period of time. However, according to this invention, the connection of the rayon-based carbon yarn 300 to the electrode portion is good, thus minimizing resistance heat generated at the connecting portions.

In order to manufacture the surface type heating element 200 according to this invention, the rayon-based carbon yarn 300 is provided at a predetermined position. One to five strands of transparent PET film yarn 302, each having the width from 1.0 to 2.0mm, are located adjacent to the rayon-based carbon yarn 300, and are interwoven with the rayon-based carbon yarn 300. Further, one or two strands of aluminum yarn 304 coated with antibacterial/anti-fungal agents and each having a width from 1.0 to 2.0mm are located adjacent to the strands of transparent PET film yarn 302, and are interwoven with the transparent PET film yarn 302. Subsequently, one to five strands of transparent PET film yarn 302 each having a width from 1.0 to 2.0mm are interwoven with the aluminum yarn 304. Thereafter, the rayon-based carbon yarn 300 is

positioned adjacent to the transparent PET film yarn 302.

Afterwards, as shown in FIG. 3b, strands of heat-resistant polyester yarn, each having a width of 0.15mm or less, are interwoven along the horizontal axis at intervals from 0.5 to 1.5mm, thus securing the rayon-base carbon yarn 300, the transparent PET film yarn 302, and the aluminum yarn 304 together.

According to this embodiment, transparent PET film yarn 302 is used. However, without being limited to the PET elements, various synthetic resin films having transparency may be used. Moreover, it is apparent to those skilled in the art that different metallic yarn containing a composition having an antibacterial function may be used, without being limited to the aluminum yarn 304.

Further, the width or the number per unit surface area of each of the rayon-based carbon yarn 300, the transparent PET film yarn 302, the aluminum yarn 304, and the polyester yarn have been described for illustrative purposes, but those skilled in the art will appreciate that various widths and numbers may be adapted.

Meanwhile, the transparent PET film yarn 302 functions to ensure sufficient illumination. The strands of transparent PET film yarn 302 are laid between the strands of rayon-based carbon yarn 300 and aluminum yarn 304, thus allowing external light to pass through the surface type heating element. Thereby, even if the surface type heating element 200 is unwound, the interior of the bathtub 220 or

the interior of the shower stall 230 may receive minimal illumination.

The aluminum yarn 304 provides antibacterial and deodorizing functions. Aluminum itself has antibacterial and deodorizing effects, but natural antibacterial materials, such as Chitin, may be added to the aluminum yarn 304. In addition, other compositions having the antibacterial effect are added to the aluminum yarn 304, thus achieving powerful antibacterial/anti-fungal effects.

Further, the aluminum yarn 304 has an electromagnetic wave shielding function and an insulating function. Thus, when the surface type heating element 200 having the aluminum yarn 304 is used to have a sauna, the sauna effect is maximized.

According to this invention, the surface type heating element 200 is manufactured by interweaving the rayon-based carbon yarn 300, the transparent PET film yarn 302, and the aluminum yarn 304 together. The radiation coating layer 306, containing the mixture of ore powder containing a large quantity of waterproof material, insulating material, fire resistant material, far infrared rays, and anions, and the far infrared radiating material is applied to a surface of the surface type heating element 200. Further, the heat blocking coating layer 308 containing the mixture of the waterproof material, the insulating material, the fire resistant material, and the heat blocking material may be applied to the other surface of the surface type heating

element 200.

When a person has a sauna, not all wavelengths of rays are used but far infrared rays are mainly used. Several wavelengths of rays are emitted from the rayon-based carbon yarn 300, but the radiation coating layer 306 causes far infrared rays having wavelengths of 5 to 20㎛ to be mainly radiated.

The radiation coating layer 306 may be provided throughout the surface of the surface type heating element 200. However, since this invention is adapted to a sauna apparatus, it is preferable that the radiation coating layer 306 be provided on only the surface of the surface type heating element 200 that faces a user.

On the other hand, the heat blocking coating layer 308 is provided on the other surface of the surface type heating element 200, that is, a surface facing away the user.

The heat blocking material contained in the heat blocking coating layer 308 is a composition comprising an UV curable or thermosetting organic binder, organic solvent, or organic polymer which is produced by dispersing a nanometer-sized metallic oxide in an organic matrix. The heat blocking material has high transmissivity of visible light, and has a superior blocking effect with respect to infrared light.

Thus, according to this invention, the radiation coating layer 306 is disposed on a surface facing a user so

as to maximize far infrared radiating efficiency and anion radiating efficiency for the purpose of air purification. The heat blocking coating layer 308 is disposed on an opposite surface to block far infrared rays. Such a construction allows far infrared rays to be concentrated on a user.

Moreover, the heat blocking coating layer 308 has high transmissivity with respect to visible rays, so that adequate illumination is ensured in the bathroom, even if the surface type heating element 200 is unwound.

As described above, the radiation coating layer 306 or the heat blocking coating layer 308 may be coated with an insulating material so as to prevent current flowing in the rayon-based carbon yarn 300 of the surface type heating element 200 from leaking to the outside. Further, the radiation coating layer 306 or the heat blocking coating layer 308 may further include a waterproof material or a water repellent material that prevents water from flowing in the surface type heating element 200, or a fire resistant material that prevents a fire from occurring.

Further, a coating layer having powerful antibacterial/anti-fungal effects as well as the aluminum yarn 304 shielding electromagnetic waves may be further provided on the surface type heating element 200.

The insulating material or waterproof/water repellent material may be made of one of polyurethane, polyethylene, polyester, polystyrene, polypropylene, polyamide,

polycarbonate, and poly-cellulose, or combinations of the synthetic resins.

Meanwhile, the fire resistant material may comprise sodium stannate, sodium tungstate, manganese dioxide, and others. However, the fire resistant material is preferably made of a boric acid compound discharging a small amount of noxious gas, when a fire occurs.

The elements of the insulating material, the waterproof material or the fire resistant material have been described for illustrative purposes. It is apparent to those skilled in the art that the insulating material, the waterproof material or the fire resistant material may be made of various elements.

FIG. 3c is a detailed view showing important parts of the coated surface type heating element, according to the preferred embodiment of this invention.

As shown in FIG. 3c, coating layers having different thicknesses may be applied to the rayon-based carbon yarn 300, the transparent PET film yarn 302, and the aluminum yarn 304.

That is, when the surface type heating element 200 generates heat, the carbon yarn side, in which electricity flows, provides furrows 320. The transparent PET film yarn and aluminum yarn side provides ridges 322. Thereby, the coating layers are unevenly applied, thus preventing the user's body from coming into direct contact with the carbon yarn 300.

Although both surfaces of the surface type heating element have uneven forms in the drawing, the uneven coating structure is preferably provided only on the surface of the surface type heating element coated with the radiation coating layer 306 which faces a user.

FIGS. 4a and 4b are wiring diagrams of the strands of the rayon-based carbon yarn, according to the preferred embodiment of this invention.

As shown in FIG. 4a, a circuit board 404 is installed in the winder 202, and electric terminals 400 and 402 are connected to opposite ends of the circuit board 404.

A wire connected to the positive electric terminal 400 and another wire connected to the negative electric terminal 402 are separately installed in the circuit board 404. The rayon-based carbon yarn 300 is alternately connected to the wires. In this case, the strands of the rayon-based carbon yarn 300 may be connected to the positive electric terminal 400 via metal paste, conductive tape, or metal clips 406.

The strands of rayon carbon yarn 300 are connected in a series parallel structure. According to this invention, ends of the strands of rayon-based carbon yarn 300, provided to the circuit board's side, are alternately connected to respective wires. Conversely, ends of the strands of rayon-based carbon yarn 300, which are provided to an opposite side, that is, a lower side of the surface-type heating element 200, are connected to each other via a

common connection part.

The wiring diagram of the rayon-based carbon yarn 300 may be shown, like FIG. 4b.

As shown in FIG. 4b, the rayon-based carbon yarn 300 has a series parallel structure. Some of the strands of the rayon-based carbon yarn 300 provided to the circuit board's side are connected to the positive electric terminal 400, while the remaining strands of rayon-based carbon yarn 300 are connected to the negative electric terminal 402. The strands of rayon-based carbon yarn 300, positioned distant from the circuit board 400, are connected to each other via the common connection part 408.

According to this invention, two or more surface type heating elements may be overlapped with and coupled to each other. Two or more surface type heating elements are prepared or the surface type heating element is woven through a 1/2 division weaving. In order to treat the terminals, strands of conductive metallic yarn acting as wefts are arranged at predetermined positions, and two sheets of surface type heating elements are combined with each other such that the strands of the rayon-based carbon yarn acting as warps are not overlapped with each other. In this case, the upper ends of the strands of the rayon-based carbon yarn are pre-treated in such a way as to be separately connected to the positive electric terminal 400 and the negative electric terminal 402. On the other hand, the lower ends of the strands of the rayon-based carbon

yarn are post-treated in such a way as to be combined with each other and connected to the common connection part 408.

As described above, the conventional surface type heating element is manufactured by coating carbon powder. However, the surface type heating element manufactured in this way cannot provide constant resistance heat.

Meanwhile, the surface type heating element may be manufactured by connecting resistance wires, such as nichrome wires, in series. In this case, when some of the resistance wires are cut, electric current to all of the resistance wire is cut off. Further, due to the characteristics of a series connection, considerably large amount of electric current flows in the resistance wires, so that the possibility of electric shock is increased. Further, since electric current flows in a single direction, strong electromagnetic waves may be generated.

However, when the strands of the rayon-based carbon yarn 300 are connected in the manner of this invention, constant resistance heat can be achieved throughout the surface type heating elements. Further, even if some of the strands of rayon-based carbon yarn 300 are cut, electric current can flow through another closed circuit.

Further, in the series parallel structure, ends of the strands of the rayon-based carbon yarn 300 distant from the circuit board 404 are connected to each other via the common connection part 408. Thus, the electric current diverges from the common connection part 408 in multiple

directions, thus offsetting the effect of electromagnetic waves.

FIG. 5a is a detailed view of the winder, according to this invention, and FIG. 5b is a perspective view of a slip ring, according to the preferred embodiment of this invention.

As shown in FIG. 5a, the winder according to this invention includes a motor 500, a reduction gear 502, a limit regulator 504, a shaft roller drive unit 506, a shaft roller 508, a cover frame 510, and a slip ring 512.

When a user desires to have a sauna, the user manipulates the controller 204. At this time, the motor 500 is driven in response to a control signal.

The reduction gear 502 and the limit regulator 504 are provided adjacent to the motor 500. The reduction gear 502 is installed at a position between the motor 500 and the shaft roller drive unit 506, and transmits the rotation of the motor 500 to the shaft roller drive unit 506.

The limit regulator 504 detects the degree of rotation of the shaft roller drive unit 506, thus preventing the surface type heating element 200 from abruptly moving downwards or upwards when the surface type heating element 200 is wound or unwound. Further, the limit regulator 504 causes the surface type heating element 200 to stop at a precisely predetermined position.

As the motor 500 is rotated, the shaft roller drive unit 506 is operated, thus rotating the shaft roller 508

under the control of the limit regulator 504. Thereby, the surface type heating element 200 is unwound and stopped at a desired position.

However, the surface type heating element 200 may be configured to be wound or unwound like a roll screen. In this case, if a power supply line is directly connected to an end of the rayon-based carbon yarn 300, the power supply line may be twisted and be consequently cut while the surface type heating element 200 is wound or unwound.

Therefore, the roll screen type home sauna apparatus according to this invention is configured such that the slip ring 512 shown in FIG. 5b is provided on an end of the winder 202, and the power supply line is connected to a slip ring connector 528.

As shown in FIG. 5b, the slip ring 512 includes a brush holder 520, carbon brushes 522, elastic parts 524, and a metal ring 526. The metal ring 526 is biased to the shaft roller 508 by the elastic parts 524.

Although not shown in the drawings, a predetermined slit is provided on an end of the shaft roller 508, and an electrode wire of the rayon-based carbon yarn 300 inserted into the slit is coupled to an end of the metal ring 526.

The brushes 522 are coupled to the brush holder 520 via the elastic parts 524, such as a spring, so that the brush 522 is in sliding contact with the metal ring 526, due to elasticity of the elastic part 524.

Thus, when electricity is supplied from a power

supply source and is applied through the slip ring connector 528 provided on a surface of the brush holder 520, the electricity is supplied through the carbon brushes 522 provided on both sides and the metal ring 526 to the rayon-based carbon yarn 300 coupled to the shaft roller 508. Thereby, there is no possibility of twisting the power supply line, so electricity is reliably supplied to the surface type heating element 200.

Meanwhile, the carbon brushes 522 according to this invention are made of alloy containing 60 to 75% carbon and 40 to 25% copper (different metals are possible), so that the carbon brushes 522 have high strength, excellent friction or heat resistance, and waterproofness. The metal ring 526 is produced by mixing 99 to 99.9% copper with 0.5 to 1% chrome (different materials are possible).

FIG. 5c is a view of a roll screen type home sauna apparatus having a mesh net, according to the preferred embodiment of this invention.

As shown in FIG. 5c, the sauna apparatus according to this invention may further include a mesh net 530 as well as the surface type heating element 200.

The mesh net 530 comprises a general net structure, and is wound around the shaft roller 508 together with the surface type heating element 200. When a user desires to have a sauna, the shaft roller 508 is rotated so as to unwind the surface type heating element 200. At this time, the mesh net 530 is also unwound along with the surface

type heating element 200.

A space is defined between the surface type heating element 200 and the mesh net 530. Thus, when the surface type heating element 200 generates heat, convection heat may be generated in the space.

Thus, when the mesh net 530 is added to the sauna apparatus, a user does not feel his or her body contacting the heat emitting surface of the surface type heating element 200. Therefore, the mesh net 530 allows the user to enjoy having a sauna in a pleasant mood.

Further, the mesh net 530 functions to isolate the user from the surface type heating element 200 in which electricity flow, thus eliminating the danger of electric shock.

Meanwhile, this invention may be realized as a manual roll screen type sauna apparatus, in place of the automatic roll screen type sauna apparatus which has been described above. That is, automatic components, such as the motor or the reduction gear, are not installed in the winder, but a spring is provided to be coupled to the shaft roller. Thus, as the spring is wound or unwound, the surface type heating element is unwound or rolled.

The slip ring of this invention may be adapted to the manual roll screen-type sauna apparatus so as to reliably supply electricity to the surface type heating element.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes,

those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

[Industrial Applicability]

As described above, the present invention provides a surface type heating element, which is constructed so that rayon-based carbon yarn containing 99.9% carbon is used, and is interwoven with aluminum yarn or transparent PET film yarn, thus having superior heat radiating efficiency, affording an antibacterial effect, and ensuring sufficient illumination.

Further, according to this invention, a radiation coating layer, which contains powder radiating far infrared rays or anions and selectively radiates far infrared rays, is applied to one surface of the surface type heating element, while a heat blocking material, which transmits visible rays but prevents far infrared rays from radiating, is applied to the other surface of the surface type heating element, thus maximizing the advantages obtained through the sauna.

Further, according to this invention, the lower ends of the strands of rayon-based carbon yarn having a series parallel structure are connected to each other by a common connection part, so that the quantity of electromagnetic waves harmful to the human body is only 2-3mg, which is

very small. This minimizes the danger of electric shock.

According to this invention, a sauna apparatus may be embedded into or attached to a ceiling, so the sauna apparatus does not occupy a large space.

Further, according to this invention, electricity is supplied to the rolled or unwound surface type heating element using a slip ring, thus preventing a power supply line from being twisted or cut.

Moreover, according to this invention, a mesh net is open toward a user, thus defining a predetermined space between the mesh net and the surface type heating element. Convection heat is generated in the space, thus maximizing sauna effect. Further, the mesh net 530 functions to isolate a user from the surface type heating element in which electricity flows, thus eliminating the danger of electric shock.